

REMARKS

The last Office Action, which has been made final, and the comments of the Examiner have been carefully considered. The remarks which follow address the comments of the Examiner noted in the Office Action.

Claims 1-4 stand rejected under 35 U.S.C. 103(a) as being unatentable in view of the combination of U.S. Patent Nos. 5,227,662 (Ohno et al.), 5,936,264 (Ishinaga) and 6,228,676 (Glenn et al.). The rejection of Claims 1-4, which are pending in the application, is respectfully traversed.

The courtesy of Examiner Louie in granting a second telephonic interview in this case is gratefully appreciated. The second telephonic interview took place on February 26, 2004 between Examiner Louie and the undersigned attorney. During the interview, the references cited by the Examiner, and in particular, the Glenn et al. patent and the Ohno et al. patent, were discussed.

More specifically, the undersigned attorney reminded Examiner Louie about the previous telephonic interview which was conducted between the undersigned attorney and Examiner Louie on January 14, 2003. During that interview, Examiner Louie suggested that Applicant add the limitation to Claim 1 that defines the inner portion and the outer portion of the electrode as residing in the same plane. Examiner Louie, at that time, agreed that the Glenn et al. patent showed contact 23 as not residing in the same plane as metalization layer 22, and that this limitation would eliminate the Glenn et al. patent as a reference.

During the interview, the undersigned attorney further reminded Examiner Louie that the claims were amended on February 13, 2003 in accordance with his suggestions. More particularly, in the Amendment dated February 13, 2003, Claim 1 was amended to more particularly define the inner portion of the electrode as residing in the same plane as the outer portion of the electrode, as Examiner Louie suggested. The claim still retained the limitations of the pair of electrodes, a semiconductor light-emitting chip electrically connected to the pair of electrodes, a mold encapsulating the semiconductor light-emitting chip, where the outer portion of at least one of the electrodes extends substantially laterally beyond the mold, and a step formed in the inner portion of one of the electrodes and positioned inside the mold.

In the Amendment filed on February 13, 2003, Applicant noted Examiner Louie's suggestion of this limitation to eliminate the Glenn et al. patent as a reference.

In the present final Office Action, the claims were rejected as being unpatentable over the combination of the Ohno et al. patent (U.S. Patent No. 5,227,662), the Ishinaga patent (U.S. Patent No. 5,936,264) and the Glenn et al. patent (U.S. Patent No. 6,228,676). During the telephonic interview which took place on February 26, 2004, the undersigned attorney pointed out to Examiner Louie that the Ohno et al. patent is no different from the Glenn et al. patent in that the inner and outer portions of the electrode do not reside in the same plane, as called for by amended Claim 1. More particularly, the undersigned attorney pointed out to Examiner Louie that Figure 7 and the cross-sectional view of the semiconductor device shown on the cover page of the Ohno et al. patent show lead 28 as residing in a different plane from inner lead 12 or lead frame 10.

During the interview, we further pointed out that Claim 1 of the subject application calls for the step being formed in the inner portion of the electrode, and that this feature was not shown in either the Glenn et al. patent or the Ohno et al. patent.

Examiner Louie asked the undersigned attorney to file a Reply to the Final Office Action in which the undersigned attorney points out these differences between the references and the claimed invention and mentions the discussions which occurred during the telephonic interview which took place on February 26, 2004. Examiner Louie advised the undersigned attorney that he would then go to his Primary Examiner and explain to the Primary Examiner the differences between what is shown in the references and the structure set forth in amended Claim 1. Accordingly, Applicant respectfully submits the following additional comments.

First, it should be noted that the Ishinaga patent (U.S. Patent No. 5,936,264) was only cited to show the encapsulation of a light-emitting chip, as the Examiner acknowledged that the Ohno et al. patent does not disclose the IC chip as being a light-emitting chip. It is clear from the Ishinaga patent that the structure of the chip disclosed therein does not have an electrode formed from an inner portion and an outer portion, where the inner portion of the electrode resides in the same plane as the outer portion of the electrode, and where a step is formed in the inner portion of the electrode inside an encapsulating mold. This is evident from Figure 1 and prior art Figure 5B, as well as the description of the terminal electrodes 2, 3 in the Ishinaga '264 patent.

Turning now to the Glenn et al. patent, it can be clearly seen from Figure 1 of the patent that contacts 23 and 27 do not reside in the same plane. This structure should be

compared to that which is shown in Figures 1A and 1B of Applicant's subject application which shows the inner and outer portions of the electrode residing in the same plane. The inner portion (on the substrate center side) and the outer portion (on the terminal side) reside in the same plane, and the inner portion has a height which is greater than the height of the outer portion to define a step 18 therebetween. The description of the outer and inner portions of the electrodes is found at page 4, lines 1-13 of the specification of the subject application. Accordingly, neither the Ishinaga '264 patent nor the Glenn et al. patent meets this particular limitation which was added to Claim 1 at the suggestion of Examiner Louie.

Turning now to the Ohno et al. patent, reference is respectfully requested to be made to Figure 7 of this patent which is also shown on the cover page of the patent. Figure 7 is a cross-sectional view of the semiconductor device of the Ohno et al. patent and shows lead 28 as residing in a different plane from inner lead 12 or lead frame 10. No inner and outer portions of the electrode reside in the same plane, and no step is formed in the inner electrode in the Ohno et al. patent.

Accordingly, the Ohno et al. patent, the Ishinaga '264 patent and the Glenn et al. patent, alone or in combination, do not teach or suggest the particular limitation added to Claim 1 at the suggestion of Examiner Louie, in that the inner portion of the electrode in which the step is formed resides in the same plane as the outer portion of the electrode.

There are some additional limitations which are found in Claim 1 and by their dependency on Claim 1, Claims 2-4, and other differences between the structure of the chip in the Ohno et al. patent and the chip-type semiconductor light-emitting device defined by Claim 1 which Applicant respectfully wishes to call to the Examiner's attention. On page 2

of the Office Action, the Examiner refers to reference no. 28 in the Ohno et al. patent as being a step which, in all due respect, is urged not to be so. Claim 1 calls for "a step formed in said inner portion" of the electrode. Reference numeral 28 refers to a lead wire, and this is not formed in any portion of element 12, be it an inner portion of an outer portion. Lead wire 28 does not function as a step. Figure 7 is a cross-sectional view, but it is not telling of the actual structure of the device disclosed in the Ohno et al. patent. Reference is respectfully made to Figures 1C, 1D, 1E, 3B, 3C and 3D of the Ohno et al. patent, and the description relating to these figures found in the specification of the Ohno et al. patent, including column 3, lines 37-41.

Reference numeral 28 is clearly referred to in the Ohno et al. patent as a plurality of lead wires, not steps. Furthermore, as clearly shown in each of the above-mentioned figures, the lead wires 28 could not possibly function as steps, because they extend not across the outwardly extending portions of lead frame 10, but rather parallel to them. This is clearly shown in the superimposed drawing of the plastic film 22 and the lead frame 10 shown in Figures 1E and 3D of the Ohno et al. patent. Thus, the lead wires 28 are not formed as steps in the inner portion of the electrodes, as called for specifically in Claim 1, nor do they function as the step 18 in Applicant's electrodes to block solder 40 from advancing. Reference numeral 28 refers merely to the lead wires. There is no disclosure in the Ohno et al. patent that lead wires 28 function as steps to prevent the flow of solder from advancing, and furthermore, it is respectfully urged that it is impossible for the lead wires 28 to perform this function. This is because they were never intended to perform this function, as is clear from the specification and drawings of the Ohno et al. patent. Their parallel orientation to the lead frame portions clearly supports this interpretation.

As stated previously, lead wires 28 in the Ohno et al. patent do not form part of the lead frame 10 or the inner lead portion 12; they are separate components. Claim 1 specifically states that the step is "formed in said inner portion". This further limitation is not met by the Ohno et al. patent alone or in combination with the other references.

Furthermore, lead wire 28 could not possibly function as a step to prevent the flow of solder from advancing, because it is positioned over plastic film 22'. If lead wire 28 were "formed in said inner portion" of the electrode, as set forth specifically in Claim 1, then the plastic film portion 22' must be part of the lead wire 28 and the inner lead portion 12, using the Examiner's analogy. This could not be the case, because the plastic film portion 22' is non-conductive and could not function as a portion of the inner portion of the electrode in which the step is formed, and the plastic portion would melt and deform, with the lead wire 28 either collapsing or separating from the electrode if its purpose were to block the advance of solder. This is respectfully urged to be a situation where the cross-sectional view shown in Figure 7 must be further viewed in context with the specification and the other figures of the Ohno et al. patent.

A further limitation was added to Claim 1 in the Amendment dated July 28, 2003. This further limitation is where the step is formed "by only a metal layer" in the inner portion of the electrode. Step 18 does not rest on, nor is it formed from, any plastic film. It is formed only by a metal layer. The heat of the melting solder will thus not deform the step 18. This additional limitation further distinguishes Applicant's claimed invention from the composite lead frame and semiconductor device of the Ohno et al. patent. As mentioned previously, lead wire 28 in the Ohno et al. patent is positioned over plastic film 22'. Thus, film portion

22' could not function as a portion of the inner portion of the electrode as it would melt and deform, unlike the step defined by Claim 1 of the subject application, where the step is specifically defined as being 1) formed by only a metal layer, and 2) formed in the inner portion of the electrode.

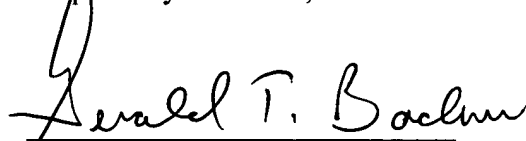
Accordingly, it is respectfully urged that Claim 1, incorporating the limitations suggested by Examiner Louie during the first interview, and including other structural features and limitations, patentably distinguishes over the references cited and is allowable. Claims 2-4 depend directly or indirectly from Claim 1 and, therefore, incorporate the limitations set forth in Claim 1. Accordingly, Claims 2-4 are also respectfully urged to patentably distinguish over the references of record and are allowable.

In view of the foregoing remarks, and the discussions between the undersigned attorney and Examiner Louie during both the first telephonic interview and the second telephonic interview which took place on February 26, 2004, it is respectfully urged that the Examiner reconsider the rejection of Claims 1-4 and allow the application with Claims 1-4.

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Serial No.: 09/731,889
Examiner: Wai Sing Louie
Docket No.: 362-51 RCE
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If the Examiner has any questions or would like to discuss this application further, it is respectfully requested that he contact the undersigned attorney at the telephone number given below.

Respectfully submitted,

A handwritten signature in cursive script, reading "Gerald T. Bodner". The signature is written in dark ink and is positioned above a horizontal line.

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